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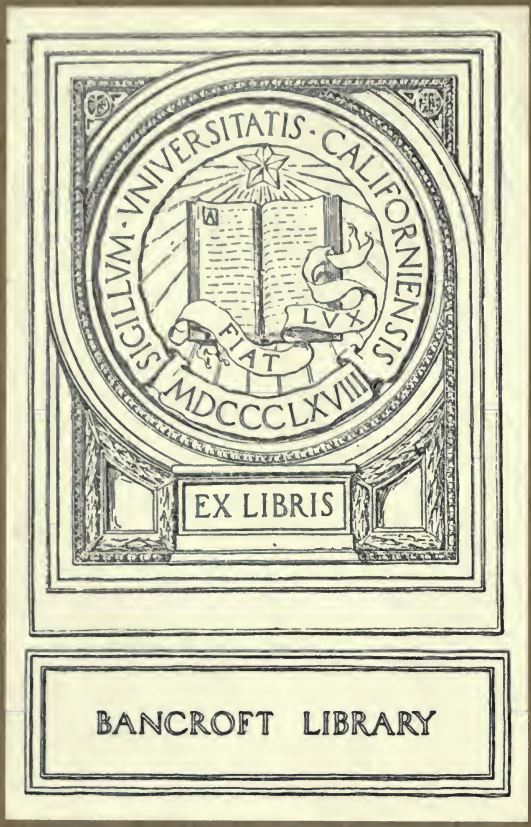

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VOL. XLIX.] ESTABLISHED BY EDWARD L. YOUMANS. [NO. 6.

APPLETONS' POPULAR SCIENCE MONTHLY.

Nevada
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OCTOBER, 1896.

EDITED BY WILLIAM JAY YOUMANS.

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NEW YORK:
D. APPLETON AND COMPANY,
72 FIFTH AVENUE.

SINGLE NUMBER, 50 CENTS. YEARLY SUBSCRIPTION, $5.00.

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commercial arithmetic none is comparable to that of expressing shillings, pence, and farthings as decimals of a pound. The rules are thereby put almost upon as good a footing as if the country possessed the advantage of a real decimal coinage." He then proceeds to develop rules by means of which any sum of English money may be expressed in pounds and decimals exactly as our money is always expressed in dollars and decimals, so that any required operation may be easily performed by the common rules of arithmetic. After this the decimals of a pound must be reduced back again to shillings, pence, and farthings. To show how the English system lends itself to easy calculation, I quote his rule, which is only approximately correct, for making the latter reduction: "*A pair of shillings for every unit, in the first place; an odd shilling for fifty (if there be fifty), in the second and third places; and a farthing for every thousandth left, after abating one if the number of thousandths left exceed twenty-four.*" Can anything be more charmingly simple and easily carried in one's head than this?

I must be content to stop without reference to a few other points raised by Mr. Spencer, for they are essentially all of a kind. There is a sentiment underlying much of his argument, to which I must briefly refer, however, because it has shown itself in other recent discussions of this subject. I refer to an anxiety lest the "poor man" be in some way injured by the proposed reform. It has come to be the fashion in all political or economical controversies to exhibit a consuming interest in the poor man's welfare; indeed, one marvels that there should continue to be any poor, so universal and so intense appears to be this anxiety to shield them from all harm. Fortunately, the so-called "poor man" is not so blind to his own interests as some would have it appear, and he is quite alive to the fact that the proposed metrological reform is fully as important to him as to anybody.

Finally, it ought to be understood that the advocates of the metric system do not assume that it can come into use immediately or without considerable hardship. It took nearly a century to fairly establish our decimal money system, which no one would now think of giving up. During all this time old units and denominations continued to be used in a lessening degree, although not authorized by law. Something of the kind must occur in the transfer from our illogical, brain-destroying, time-consuming system of weights and measures for the more perfect system for which it is sure to make way. Furthermore, they heartily welcome and desire the presentation of all arguments against or objections to the metric system, believing that the more widely it is known and discussed the more supporters it

will have. They expect to meet occasionally such "intelligent prejudice" as is exhibited by Mr. Herbert Spencer, whose contribution to the discussion of the subject is sure to be considered in the years to come as altogether the most remarkable to be found in any time or tongue.

NEVADA SILVER.

By CHARLES HOWARD SHINN, 1852-1924.

A THIRD of a century ago the surface bonanzas of the Comstock began to yield their treasures. Californians long skilled in gold mining were rushing by thousands into the newly discovered silver districts, and prospecting the mountains and deserts east of the Sierras. In fact, the whole Pacific coast was ringing with shouts of "On to Washoe!" In a few years this obscure, long-neglected corner of western Utah became the State of Nevada. It developed a multitude of mining camps besides the Comstock; it created new forms of mining skill, maintained vast dependent industries, contributed revenues to distant cities, sent forth new groups of millionaires, gave to the world new types of frontier character, and added a dramatic chapter to the story of American commonwealths.

The land itself is worth a moment's attention. It is a high plateau, gridironed by short, parallel mountain chains, the most noted of which is the Washoe Range, separated from the Sierras by a line of small Alpine valleys, and rising, in Mount Davidson, to a height of 7,827 feet. East, south, north, extend weary miles of desert, relieved by a few oases. The scanty rivers of Nevada soon lose themselves in alkaline basins. According to an old frontiersman, reported by Dan De Quille, "the Almighty once started out leadin' a number of small rivers along, meanin' to unite them into one large one, and take it to the Pacific. But before he had more than started it grew late Saturday night, so he tucked the ends down into the sand, where they have remained ever since."

Stephen T. Gage, of the Southern Pacific Railroad, tells an interesting story of Horace Greeley's journey across the continent. The distinguished editor had reached Placerville, California, and had been met by a few ardent followers on horseback. The boisterous mountain town was politically opposed to Greeley, but when the group of young men, of whom Gage was one, brought him out on the plaza for a speech, a great crowd assembled.

"I believe," said Greeley, "that God never made anything without a purpose. But the wilderness that I have crossed is

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certainly worthless for agriculture. Unless there shall prove to be great mineral wealth there, it has been created in vain. But if, in the workings of Divine Providence, vast treasure houses are revealed, as I believe there will be, then, my friends, it will take the labor of a hundred thousand California miners a hundred thousand years even to prospect it!"

Even while Greeley spoke a small group of ignorant prospectors, climbing the cañons that slope south from Mount David-

CARSON RIVER CAÑON.

son, were approaching the Comstock ledge. They were, in fact, already filling their rude sluice-boxes with decomposed rock from the giant lode, and were washing out a little gold, while they threw many a lump of nearly pure silver down the gulches with loud imprecations because the "blue stuff" clogged the machines. These miners were the remnants of several larger camps that had grown, flourished, and fallen into ruins in western Utah during eight or ten years, but they were not the first settlers of the Nevada region. The Oregon trail had three thousand emigrants

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on the road in 1846, and as soon as the shout, "California gold!" was heard, the deep-trampled highways across the desert began to be strewed with wrecks of wagons and bodies of horses and oxen. Thousands of men made camp after camp in western Utah without washing out a panful of dust or breaking off a specimen of quartz. Meanwhile Mormon traders, anxious to sell supplies to wagon trains, established small stations along the trail. These traders were often colonists sent out from Salt Lake, under strict orders not to cross the mountains and not to mine for gold. According to a letter in the Sacramento Transcript of October 14, 1850, the hungry emigrants were often forced to sell "a horse, an ox, or a mule for twelve, ten, or even two pounds of flour," and in 1849 matters must have been even worse.

Placer gold was found in the winter of 1849 in a small gulch near Carson Valley, and one or two men worked the deposit, with poor results. The wandering Mormons abandoned their trading posts, but in 1851 Colonel Reese, from Salt Lake, made a permanent settlement. With him came, as teamster, bibulous, feather-brained James Fennimore, afterward known on the Comstock as "Old Virginia," who soon began placer mining in "Gold Cañon." By November the Carson region contained about twenty settlers; miners, herdsmen, and nomads of every description increased the whole population of western Utah to nearly one hundred. Squatter government began, and Congress, with unconscious humor, was petitioned to create a separate Territory for this handful of settlers. The Utah Legislature, with equally unconscious humor, endeavored to hold the region by dividing it into seven huge parallelograms of counties, only one of which appears to have contained any people. The judge sent to Carson County was referred by the Gold Cañon miners to their local "rules, usages, and customs," adopted in the main from California camps.

Local traditions contain much that is worth passing notice. Israel Mott, for instance, "built his house out of the beds of abandoned emigrant wagons." "Ragtown," on the Carson, received its name because of vast heaps of rubbish that marked the camp where the incoming host "ran into the water waist deep to drink like animals," and threw their desert-worn garments in heaps on the cacti and sagebrush. The last night of 1853 there was a dance "in the log house over Spafford Hall's store" at the mouth of Gold Cañon. Eight women were present, and this number constituted "two thirds of all the white women in western Utah." Of white men there were about a hundred—from Lucky Bill's, Fort Churchill, Twenty-six-Mile Desert, Eagle Ranch, and other settlements, as well as from the placer mines.

In 1857 the Mormon settlers were called back to Salt Lake by a messenger from the Prophet. Some fifty families left claims,

cabins, water ditches, and other property, loaded one hundred and fifty-three wagons, and were on the road in three weeks. A few years later one of them, the noted Orson Hyde, wrote to the possessors of a sawmill he had built, demanding its return, and adding: "This demand of ours remaining uncanceled shall be to the people of Carson and Wassau as was the ark of God among the Philistines. You shall be visited of the Lord of hosts with thunder and with earthquakes and with floods, with pestilence and with famine, until your names are not known among men." The letter was printed, and the camps of 1860 rang with loud laughter. But in 1857 no one could see anything amusing in the departure of the Mormons. Emigrant travel had ceased, traders had gone, villages were deserted, plows left in the furrows, cabin doors flung open. Even Gold Cañon placers were nearly exhausted. Everything seemed "played out."

The early miners of Nevada knew nothing of prospecting as a business. They were so thoughtless and ignorant that it never occurred to them to look for the source of the metal they were obtaining in Gold Cañon and other ravines that headed in Mount Davidson. The little gold they found became more and more alloyed with silver, so that its value decreased from nineteen dollars an ounce to twelve dollars. The camp of Johnstown in Gold Cañon, where they wintered, dwindled in size, and discouraged miners went to other districts. Meanwhile two prospectors of education and ability, the Grosh brothers, were secretly exploring the Washoe Mountains for silver. Their letters home prove that they found "a monster vein" and other good prospects, and they began to organize companies in the Atlantic States and in California to work these claims. But one brother died from an accident early in 1857; the other lost his life in the Sierra the following winter. The first knowledge of the Comstock perished with these two brave, thoughtful, reticent young prospectors.

All the men who aided in the discovery of the famous mines wintered in Johnstown in December, 1858. Among them was one Henry Thomas Paige Comstock, a curiously ignorant, credulous, and speculative miner, familiarly known as "Old Pancake." "My first recollection," he wrote, "is packing beaver traps; trapped all over Canada, Michigan, Indiana, and the Rocky Mountains." Comstock, "Old Virginia," Peter O'Riley, Pat McLaughlin, "Kentuck" Osborne, "Long John" Bishop, Manny Penrod, Sandy Bowers, and a few others had been more or less together. Sometimes they were in Gold Cañon, sometimes in Six Mile Cañon, sometimes crossing from the head of one to the head of the other, along the side of Mount Davidson, over the top of the Comstock ledge. In January, 1859, a streak of warm weather tempting

some of them out, Comstock, "Old Virginia," and several others found "surface diggings" near "Slippery Gulch." They named the place "Gold Hill," and, staking out claims, proceeded to work the decomposed outcroppings over Crown Point, Yellow Jacket, Belcher, Kentuck, and other great mines as yet undiscovered. From the time they started the rockers, using water from a spring close by, Gold Hill averaged twenty dollars a day to the man. June 1st, O'Riley and McLaughlin, whose claim in Six Mile Cañon paid only two or three dollars a day, suddenly cut into the rock on the surface of Ophir, at the north end of the Comstock, and began to take out gold at the rate of a thousand dollars a day. They had only been working a few hours when Comstock happened along, saw the value of the discovery, laid a general floating claim to a mythical stock ranch in the region, and fairly bluffed the good-natured discoverers into taking himself and Manny Penrod as equal partners. "Kentuck" Osborne afterward came in, and the five took up the original Ophir claim.

The miners in the region soon staked out claims around Gold Hill and Ophir. "Dutch Nick" started a saloon and restaurant in a tent. "Old Virginia" went on a spree one night and christened the north-end camp "Virginia City." Comstock bubbled with happiness, and flung his money broadcast. But a rancher from Truckee Meadows, visiting the camp, picked up some of the despised "blue stuff" from the waste heap of Ophir, and afterward gave it to Judge Walsh, of Grass Valley, California, with the remark that "over in Washoe the miners were throwing it away." An assayer reported it to be nearly pure silver. This happened about midnight, and before dawn Judge Walsh was miles on the road to Virginia City, while hundreds of other men were making ready to follow. The Truckee Meadows rancher paid no attention to the excitement he had caused, but went quietly back to his farm. When Judge Walsh reached the camp Comstock sold for $11,000, only $10 of which was paid down. McLaughlin soon sold for $3,500, Osborne for $7,000, Penrod for $3,000. Careless, ignorant, the first Comstockers were blown aside like leaves in a whirlwind. They spent their money and drifted off here and there, pursued by ill-fortune. McLaughlin was soon cooking for a gang of men at $40 a month; "Old Virginia," while on a spree in 1861, was thrown from a horse and killed; Comstock, who had parted with his interests exactly two months after the ledge was struck, branched out into financial and matrimonial ventures, spent every dollar, wandered over Idaho and Montana vainly looking for another fortune, and in 1870 committed suicide. Sandy Bowers, who was considered a millionaire, went to Europe with his wife "to see the queen," and "had money to throw at the birds." He built a costly stone man-

VIRGINIA CITY, NEVADA, LOOKING TOWARD THE DIVIDE, ETC., TO GOLD HILL.

sion in Washoe Valley before birds of prey obtained all his money. His widow, the "Washoe Seeress," made a living for years by curiously futile predictions regarding the stock market, and still reads the future for those who care to listen. One after another all the placer-mining Comstockers went down before the rush of silver seekers.

That rush was in many respects the most remarkable one that California ever had known. Decidedly the best account was written by J. Ross Browne, who made his Peep at Washoe a classic of early Nevada. Stirred, he says, by the shout of "Silver! silver! Acres of it! Miles of it!" he left San Francisco in March, 1860, and made his way to Placerville. Beyond this point there were no stages. The town was full of men anxious to cross the mountains, and "practicing for Washoe" in the saloons. Every sign bore Washoe in large letters. Pack trains were starting daily for the mines. No animal could be had for love or money. "Lodging accommodations" consisted of enough floor space on which to lie in one's blanket.

The next morning Browne started on foot. The muddy trail was literally lined with broken-down vehicles and goods of every description. He stopped at nightfall in "Dirty Mike's" shanty, in which the bar and the public bedroom were the chief features. The second day hundreds of persons were in sight along the trail—men with wheelbarrows, handcarts, donkeys, mules; gamblers on fancy mustangs, whisky peddlers, organ grinders, drovers, Mexicans. Rain, snow, and slush prevailed for miles before he reached the log cabins of Strawberry. There he slept on the floor with about forty other pilgrims, and had his stockings stolen, which "were above gold or silver in this foot-weary land." Three feet of snow in the morning, four hundred men in the camp, and provisions low; eight hard miles to the summit, nine more to Woodford's. Browne and several others tried the trail, but were forced to return to Strawberry. The next day he tried it alone. The trail was over old snow, honeycombed with holes hidden by the new snowfall; pack trains were floundering through and occasionally falling into the cañons. Wind and sleet all day; mud knee deep in Hope Valley; all in all a terrible day's experience. The fifth day Browne's course was along the Carson. He was so worn out that he could only cover about eighteen miles between sunrise and nine o'clock at night. The sixth day he arrived at Carson City, and took the stage for the mines.

Virginia City, as Ross Browne saw it in the spring of 1860, lay outspread on a slope of mountains, speckled with snow and sagebrush and mounds of upturned earth. The dwellings were rude board shanties; tents of blankets, sacks, old shirts, and canvas; huts of mud and rock, caves in the hillside, and hollow heaps

of brush. Piles of goods were scattered about in the rain and snow. A scathing wind, the "Washoe zephyr," tore the huts apart and filled the air with gravel. Crowds were gathered in open places, trading claims or fighting over them. Other crowds were drinking and gambling in the numerous saloons. Rough, unkempt, unwashed miners, speculators, bummers, thieves, cutthroats filled the raw, unsightly mining camp with horrible confusion. "In truth," says our artless adventurer, "there was much to confirm the foreboding with which I had entered the Devil's Gate."

In a short time the demands of the Washoe country developed a complete system of transportation over three great toll roads, the finest on the Pacific coast. Massive freight wagons, marking in every detail the utmost skill of California workers in wood and iron, carried all the supplies for Nevada. Bearded and weather-beaten freighters, who were also owners of their outfits, walked beside the great mule teams. Each freighter carried his rod of empire, a short hickory handle to which was attached a long, close-plaited whiplash as big as one's wrist at the swelling part. At first receiving twenty-five cents a pound for whatever was carried between Sacramento and Virginia City, and hauling a thousand pounds to the animal, the freighter in a year or so was able to move twenty-four tons besides the wagons, with a sixteen-mule team, at a cost of four cents a pound for the entire distance. It is said that there is not on record in courts or newspapers a single instance of the loss of goods in transit either by fraud, force, or carelessness during all the years of the Nevada freighter's glory.

One stage line carried twelve thousand passengers to Nevada in 1863. Schedule time in 1861 had been three days for the one hundred and sixty-two miles, but it was soon reduced to eighteen hours. Three wealthy mining operators were once taken from Virginia City to the steamboat wharf in Sacramento in twelve hours and twenty-three minutes. Old travelers still recall with pleasure the ride across the mountains on the Placerville route. Its most striking moment was when one first saw from the summit of the pass the hyacinthine waters of sealike Tahoe and the level desert. "The eastward-gazing grizzly bear," to quote from one of the stories written by an old Elko silver miner, the late Dr. Gally, "lifts his flexible nostril to sniff the odor of the arid waste, then slowly turns and prowls westward. There is a visible line eastward where two worlds appear to meet. Beyond is the great 'empire of Artemisia,' where gold and silver were married in the volcanic chambers of the awful past. One sees the land of Washoe outstretched from the mountain tops, with its browns and grays, its arid junipers and dull nut pines, its crags of lime-

stone, basalt, porphyry, granite, in naked barrenness. There, underfoot," writes Dr. Gally, "the world is dry, gray, silent. Overhead, during the long cloudless day, it is pale blue, dry, silent. All abroad it is gray or dark with mountain distance, and it is silent. Silence is everywhere. No roar of far-off torrents tumbling down the hills to jar the night air underneath the stars —the stars still are, but all the torrents have departed. At some lost period backward of all dates, the Great High Sheriff of the universe in open court has cried Silence and has been obeyed."

Into such a land the silver seekers came, and it claimed them for its own. Soil, climate, topography, environment, began to create the Nevada type, with its large freedom, its quick comprehension, its broadly humorous buoyancy, and similar characteristics that one finds abundantly illustrated in such books as Mark Twain's Roughing It and in the writings of a great group of younger newspaper men. "Desperate climatic humor" is what Dr. Gally calls it. Occasionally an old copy of an early Nevada newspaper turns up, fairly scintillating with wit and sarcasm, but for the most part the files have been destroyed in the great fires. Said brave old De Quille, companion reporter with Mark Twain on the Territorial Enterprise:

"I used to make the newspaper my notebook for years, and I thought what a book I could write some day out of that notebook; but now I don't know of a single file in existence."

Still there are gleams of the past in stray copies that have escaped the fires. Senator Stewart was the most prominent man on the Comstock in the days before Sharon, and the Gold Hill News, amazed at his audacity, once likened him to the Colossus of Rhodes—he was as large and contained as much brass. Mark Twain, in his forgotten Proceedings of the Third House, once burlesqued nearly every member of the Constitutional Convention of 1863. Larrowe, of Landor, for instance, was made to glorify the "nine sceptered and anointed quartz mills" of his district until the president ordered him to "hold his clatter" and drop Reese River quartz-mill statistics. Mr. Stewart, after a long speech on miners' taxes, was told: "Take your seat, Bill Stewart. I have been reporting and reporting that same infernal speech of yours for thirty days. . . . You and your bed-rock tunnels and your blighted miners' blasted hopes have gotten to be a sort of nightmare to me and I won't put up with it any longer." The wealth of material in this field would fill volumes instead of paragraphs.

Hardly had the first rich ore been taken from the Comstock when an age of litigation commenced. The early claims overlapped and were badly defined, some being taken up under placer rules, others as quartz claims, and all without accurate surveys. Mat-

ters went from bad to worse, as every one had access to the record book in the pioneer camp, and most of the prospectors changed their stakes and boundaries as often as seemed best. The most casual study of the Comstock region in 1860 reveals the wildest Walpurgis-night revels of conflicting claims of every size, shape, and age tumbling over each other three and four deep. Besides, the Virginia lode was parallel to the Comstock, and many lesser veins crossed it or ran near, thus giving rise to the great legal problem of the day, Was the Comstock one ledge or two ledges?

Then followed the famous mining cases that fill volume after volume of the Nevada reports—Savage against the Bowers Company, Chollar against Potosi (pronounced Potoseé by all old "Cōmstôckers"), Burning Moscow against Ophir, and others of

Flash-light of Drills in Nevada Mine.

equal interest. The total number of lawsuits for twelve mines during this period is 245, and 168 of these were "actions brought" to dispossess the claimants of ground that, under the single-ledge theory, belonged to the first locators. The direct cost of this litigation was $10,000,000, or one fifth of the entire product of the lode during the fighting period. Pitched battles occurred underground; mines were flooded with water or filled with smoke. Forts were built, armed men employed, and battles fought on disputed claims. Some of the best mining lawyers of America were trained in this age of litigation. Stewart, known as "Old Invincible," tireless in devotion to his clients, received $100,000 from Belcher and $30,000 as a single fee from Yellow Jacket. The reputation of the Territorial courts suffered, and some of the judges resigned under stress of public wrath. Lord, in his History of the Comstock, sums up the period from 1860 to 1865 with

the terse remark that "the Washoe bar at that time was hardly a nursery for tender consciences."

The first problem that troubled the miners in the midst of their lawsuits was how to handle the immense bodies of ore. To develop the various claims by means of the usual shafts, tunnels, drifts, cross-cuts, and other underground workings was unusually difficult. The vein matter of the great fissure varies from 100 feet to 1,500 feet in width. The whole body was once a seething mass of fire and steam. It still remains in many places so hot that the appliances of modern science hardly enable the miners to accomplish any work. The ledge first sloped west, became vertical at about 200 feet down, and then bent toward the east, thus necessitating a second and finally a third line of shafts. Machinery for pumping, for hoisting, for ventilating and lighting the depths of the mines, had to be constructed upon a larger scale than ever before attempted. As the ore bodies were opened they were found to be so wide that the timbering system failed entirely. A new method, known as the "Deidesheimer square sets," was invented, which is still in use in all large mines. It consists of short timbers mortised together in frames that can be built up to any height or width, like the adding of cells to a honeycomb. A few years later the mines siphoned water from the Sierras under a pressure of 1,720 feet. Incidentally the miners invented the V flume to carry lumber down the Sierra slopes. The annual supply of timber for the mines amounted by 1866 to 25,000,000 feet of lumber and 170,000 cords of fuel. The consumption of both increased steadily until in bonanza days 80,000,000 feet of lumber annually disappeared into the drifts and chambers and 250,000 cords of wood went up in smoke and flame.

Metallurgists, too, found endless study in the methods of reducing Comstock ore. Beginning with slow Mexican *arastras* and *patio* yards, adopting in 1860 California stamp mills, and modifying the amalgamating apparatus to save the silver, the modern "Washoe process" was finally adopted, though only after years of costly experiments. For a time every one went rainbow-chasing for something to perform impossible chemical feats. One pioneer mill man used to put strong decoctions of cedar and juniper bark into his amalgamation pans; others actually used sage-brush tea, it being argued that Nature had created the otherwise worthless shrub for the express purpose of getting the metal out of Nevada's mountains! Persons with secret processes overran the mining districts, each one with the whole trick contained in a little bottle in his vest pocket, ready for a consideration to pour a few drops into the amalgamating pan. San Francisco was ransacked for drugs to put into the batteries with the pulverized ore. Alum, saltpeter, borax, potash, all the acids obtainable, tobacco

enough for a "sheep-dip," a multitude of articles never before used by miners, such were some of the contents of the Nevada mill men's witch caldrons in the early sixties. "The object appeared to be," says an amused observer, "to physic the silver out of the rock."

Slowly, after immeasurable waste, crude methods gave way to better ones. Mills were built in Washoe Valley, in the cañons, and on the Comstock, but the greater number were along the Carson River, so as to be run by water power. No less than 76 mills, costing over $6,000,000 and carrying 1,200 stamps, were in operation before the end of 1861. Some of the mills of the period are still remembered for their extravagant construction. Gould and Curry built one on a terraced hill where the mine owners spent about $1,000,000 in picturesque and useless magnificence. After a few years, when their bonanza began to fail, it was found that the reduction of their ore was costing fifty dollars a ton. The machinery was thrown aside, and it required $600,000 to put the mill in working order again. Everywhere, through years of readjustment, mills were torn to pieces, rebuilt, enlarged, made to do better and better work, until the results produced when the great bonanza mines were running at full speed attracted the attention of mill men all over the world.

RUINS OF OLD MILL NEAR THE COMSTOCK.

What is known on the Comstock as the old group of bonanzas began comparatively near the surface. The yield of the diggings of 1859 had been about $100,000 for the entire lode. In 1860 it yielded in round numbers $2,000,000. After that the mines were developed so fast that by 1865 the output of Storey County, most of it from the Comstock, was $9,500,000. During twelve years after 1859 the product of all the Comstock mines was $145,000,000.

Work went on with increasing zeal. Mines that were in "*borrasca*," or barren rock, were kept going by immense assessments. If the present business methods that prevail in mining had been adopted on the Comstock, half of this enormous yield of $145,000,000 would have been clear profit, but the greater part of every bonanza went into running and extraordinary expenses. Reckless waste and superb enterprise seemed to go hand in hand. The numbers of relatives and friends that the owners of the mines managed to support by making positions for them can hardly be reckoned. Everybody, from servant girls to bankers, speculated in Comstocks and other mining shares.

In 1860 more than five thousand claims within thirty miles of Virginia City were "on the market." Frenzied prospectors were marking out thousands more, until the most remote corners of the desert were "pegged down with claim stakes" set on indications which were seldom attractive to a mineralogist. Iron pyrites and all sorts of worthless combinations seemed as good as gold or silver to the enterprising adventurers. Before long men were claiming to have found huge ledges of iridium, platinum, and plumbago. One Washoe speculator being told by a gentleman that an ambergris mine would be valuable, replied that he had just staked out one! A company tunneled for weeks into the granite of Mount Davidson in order to tap an alleged lake of coal oil.

No one can reckon up the number of prospect holes that dot Nevada. Millions of them, mere ragged cuts or pits in the tawny hillsides, make wind-blown heaps on every hand between the clumps of dark sagebrush and the dull yellow of an occasional sunflower. Only one prospect hole in a hundred ever materialized into a recorded claim; only one claim in a thousand ever became a mine. Up to 1880 Virginia City and Gold Hill alone had 16,000 registered claims, and less than a dozen really great mines. To sum it up, the amount of dead work and wasted capital in every mining region almost surpasses belief. Ruins of mills and dwellings, nameless graves in the canoñs, fragments of old trails washed by the storms of thirty winters, are all that mark the sites of many once-aspiring districts. In Esmeralda and White Pine, which the late Dr. DeGroot used to call "those Golgothas of Nevada speculators," what millions were fruitlessly scattered!

The entire history of the Comstock lode is revealed by the assessments, dividends, and fluctuations of the stocks of separate mines. Before the close of 1861 eighty-six companies were working on or near the great lode. Gould and Curry, a marvelously rich mine, declared $2,908,800 in dividends in 1863 and 1864. This was upon an actual investment of less than $200,000. But the ex-

penses of the mine, which worked 110,000 tons of ore during those two years, were nearly $6,000,000. It is believed that twice as much could easily have been paid in dividends, but, as the president of the company said, "every shareholder was crazy and wanted it snaked out at once at any cost." Gould and Curry, July 1, 1863, was selling at $6,300 per foot (the old way of measuring values); in July, 1864, it was worth only $900. Belcher was one of the dividend mines of the Comstock, having paid $16,000,000 up to 1880. It had 104,000 shares after 1869. In that year prices ranged from $12 to $35; in 1870, sank from $36 to $1; in January, 1871, rose to $6, and in December to $450; in Janu-

Alta Mine, Mill, and Dump, Gold Hill.

ary, 1872, sank to $6, and in April rose to $1,525, fluctuating all that summer down to $1.50, up to $95, and back and forth after this fashion for years. Once it rose in a month from 25 cents to $113 a share. Out of 103 Washoe mines listed, only six ever paid more money in dividends than they levied in assessments. These six were Consolidated Virginia, California, Belcher, Crown Point, Gould and Curry, and Kentuck. Some of the assessments levied upon mines that never paid a cent to the stockholders remain unparalleled in mining history. Ten mines sank nearly $17,000,000 before 1880. Assessments on Bullion were $3,352,000; on Overman, $3,162,800. Alta, Baltimore, Caledonia, Mexico, Imperial—these and other non-producers are still remembered with sorrow by thousands of investors.

Nevertheless, viewed as a whole, the Comstock was immensely profitable. In twenty-one years from the summer of 1859, according to Government reports, the mines levied in assessments $62,000,000. The dividends paid during the same period aggregated $118,000,000. Striking a cash balance, the Comstock ledger shows an actual profit of $56,000,000. The total bullion yield for the same period was $306,000,000. Subtracting dividends and adding assessments, we find that the cost of purchasing, maintaining, defending, and developing the great lode for twenty-one years was $250,000,000. Three fourths of this sum came from the mines themselves, the other fourth was gathered from direct assessments. The prospectors and original locators had received less than $100,000. The various owners paid less than a million dollars out of their own pockets, as working capital, before assessments and the stock-gambling period began. Since 1880 the yield of the Comstock has been decreasing, and many of the mines have been shut down. The ledger account of the Comstock with the public remains practically unchanged.

The most dramatic events in the story of the Comstock cluster about a series of struggles for its control during the ebb and flow of alternate borrasca and bonanza. Nothing was lacking to make the period impressive. The financial leaders of the Pacific coast were conquering Nevada, while another group of men were winning victories that shortly led to the culminating treasure of the lode, and while the indomitable Sutro was toiling in his great tunnel. So vast and ruthless was the battle that its far-reaching results still influence politics and social life of California and Nevada; men still divide upon issues which began in the depths of the Comstock a quarter of a century ago.

In 1864 the ore deposits were worked out, and rayless gloom settled over the Comstock. The Bank of California, through its resident agent, William Sharon, had been making advances on mills and allowing the mine owners to overdraw their accounts. The security in both cases was only undiscovered ore, and if the lode were really exhausted the whole camp was ruined. Ralston, the head of the bank, visited Virginia City in 1865, and agreed with Sharon that the time had arrived to gain control of the district. Loans, instead of being lessened, were increased, to what extent is not known, but it was afterward said by Sharon that at one time before 1870 $3,000,000 of the $5,000,000 capital of the bank was on the Comstock. In June, 1867, the famous mill and mining company was formed by W. C. Ralston, William Sharon, Alvinza Hayward, D. O. Mills, Thomas Bell, Charles Bonner, William E. Barron, and Thomas Sunderland. It was the strongest possible combination of capitalists and mining men; its business was to manage the mills and mines that had now fallen into the

hands of the Bank of California through foreclosure and through manipulations of stock. It also aimed at securing control of others, and ultimately at directing the output of the entire lode.

There are, let me explain, two systems of handling ores. A mine can own its mills, or it can send to a custom mill. On the Comstock the mine-owners' experiments in building mills had proved disastrous. The independent millman was a more efficient ore-worker than a salaried superintendent. But the Comstock system did not secure the permanent welfare of the outsiders. What Prof. Raymond calls "the piratical policy of gutting the mines" was carried on in bonanza times at such a shocking rate of speed that it unduly stimulated the building of more mills, and then left the mines totally unable to sustain any of them. It is not surprising that the Union Mill and Mining syndicate were soon able to gather in seventeen of the leading mills and to keep them running on ore, while outside mills could not make a living. It became evident that the substitution of Sharon for Stewart as the leading personal force on the Comstock was in reality the most complete revolution the sagebrush land had yet known.

Nevada had long "talked railroad." Legislatures, Territorial and State, had granted many charters, but after a few abortive efforts the last of these haphazard schemes was dead. Sharon, the man of affairs, sent for James, of the Sierra Nevada Mine. The following conversation is said to have occurred:

"Can you run a railroad from Virginia City to the Carson River?"

"Yes."

"Do it at once."

Bancroft Library

Within thirty days the winding course, twenty-one miles long, was surveyed; graders were at work; rails were on the way; men were hewing ties in the Sierras; an obedient Legislature had passed a new charter and had authorized $500,000 in bonds as a bonus to the road; lastly, the mines had subscribed $700,000. It was a busy month, even on the Comstock. Extended to a junction of the Southern Pacific at Reno, the Virginia and Truckee Railroad cost about $3,500,000. The maximum grade is 116 feet to the mile; the curves of the track in the thirteen miles and a half of mountain distance make seventeen full circles, and the rise is 1,600 feet.

Sharon had put Chinese graders at work, but the miners' unions of Gold Hill and Virginia City marched out a thousand strong. The sheriff halted them, and they sat down on the rocks to hear him read the riot act. That ended, they rose with shouts of Homeric laughter, gave three cheers for the sheriff, and moved resistlessly on the graders' camps. The Chinese "ran like rabbits" up the gulches. The miners told the boss to quit work, and,

marching back, sent word to Sharon that no Chinamen would be allowed in the district under penalty of a strike that would shut down every mine on the lode. In twenty-four hours the Chinese were dismissed and white graders took their places. Defeated here, Sharon silently made ready for the real labor conflict that he foresaw. It began when the first trains entered Virginia City. The fine old silver freighter, in Nevada slang the "mule skinner"; the bull-puncher walking sedately beside his oxen; even that aristocrat of the fraternity, the lordly "silk-popper," flicking his playful whiplash at the leaders as he drove his stage-coach down Geiger's grade—these, all these, after fierce, useless struggles, disappeared into the unrailroaded distance. "Sharon's iron mules," as they said, "had crowded them off."

Meanwhile the total bullion yield of the lode, which was $16,000,000 in 1865, continued to decrease till in 1869 it was only $7,500,000. None knew better than Sharon and his associates that although borrasca had put them into possession, a few more years of borrasca would utterly smash their fortunes. There had been in all eleven bonanzas up to 1869, but now all were "worked out," and the ordinary ore in the mines not only grew poorer and scantier on the lower levels, but was harder to work. Everything was in eclipse. The miners were following a mere stringer of ore on the nine-hundred foot level of Yellow Jacket that gave Sharon a little hope, but troubles with the miners and disastrous fires intensified the situation. By 1870 some of the members of the syndicate began to weaken; it was openly said that the Comstock had paid its last dividend; the cities of the lode were trembling on the verge of panic.

The famous John P. Jones, since United States Senator, was superintendent at Crown Point, and, like all the rest, was vainly looking for ore. The stock fell to two dollars a share, making the total value of the mine, with its costly plant, only $24,000, and assessments went unpaid. Late in 1870 Jones found an ore body, and, joining forces with a discontented member of the bank syndicate, wrested control of the mine from Sharon before he knew of the bonanza, which in eighteen months more raised the stock-market value of Crown Point to $22,000,000. They also organized the Nevada Mill and Mining Company in direct opposition to their old associates. Nevertheless, Sharon's lesser defeat only emphasized a greater victory. His interests in other mines doubled and quadrupled in value, empty treasuries were filled by outside investors, and search for new ore bodies was prosecuted with renewed energy.

The story of the rise of Mackay and Fair reads like a leaf from the Arabian Nights. Like Jones, they had been poor and unknown, working for daily wages. Associated with Flood and

O'Brien, they discovered the Big Bonanza, the richest treasure of the Comstock. Mackay outranks the rest of the group, because his rise was more remarkable and his grasp of circumstances more firm. From toiling in the lower levels he rose to be superintendent of one of the smaller Gold Hill mines. Like Fair, he saved every dollar and put it into stocks under his own control. Before long he was interested in "Kentuck," a rich little mine, and it began to pay dividends again. His own statement is that for years he had labored with all the powers of mind and body to make himself "master and manager of the greatest mines in the world." Kentuck gave him the start. Mackay and Fair, now associated in every enterprise, ventured to make a fight for the control of Hale and Norcross, which they acquired in March, 1869, its stock, like everything else on the lode, being greatly depressed. Fair, leaving Ophir, of which he had long been superintendent, soon put Hale and Norcross on the dividend list. Old Comstockers still praise "Uncle Jimmy's fine nose for ore." The mining skill of Fair, as well as of Mackay, rose at times into the domains of genius. Before the close of 1869 they controlled Savage and Bullion. This proved a bad affair, and nearly ruined them. The Bank of California millionaires began to feel relieved in mind. In a year or two, they said, Mackay will be back in the face of a drift, at four dollars a day, and Fair can be made useful somewhere on a superintendent's salary. But the Mackay firm, still convinced of the reasonableness of their system of exploration, concentrated their last resources upon a long-neglected portion of the lode.

The Comstock mines begin at the north with Sierra Nevada, 3,300 feet on the lode; coming south, Union Consolidated follows, 600 feet; then Mexican, the same size; then Ophir, 675 feet. All these were being worked on a large scale. Next came a group of small neglected claims whose titles were in dispute, 1,310 feet in all, followed by Best and Belcher, Gould and Curry, Savage, and Hale and Norcross, which completed the famous north-end, or Virginia City, group of mines. The neglected section, 600 feet of which was afterward known as California, and 710 feet as Consolidated Virginia, was worth only $40,000 on the stock market. As Mackay and his associates bought, the stock rose; the three-fourths interest they desired cost $100,000. They took control in January, 1871, and began mining operations, sinking a new and large shaft and pushing a drift north from Gould and Curry, nearly 1,200 feet below the surface, by a special contract with the owners of the mines crossed.

One day Fair discovered a slight change in the barren rock and determined to follow a narrow seam hardly thicker than a knife blade. Sometimes it was only a film of clay, but occasion-

ally a pin point of ore was seen. For hundreds of feet the miners drifted beside this slender clew. Fair became ill, and the workmen lost it, but on his return he picked up the ore thread. They were now a hundred feet in Consolidated Virginia ground, and the price of the stock began to break, when suddenly the stringer widened to a vein of sixty-dollar ore. In October, on the 1,167-foot level, the top of the "Big Bonanza" was uncovered; the drift went 148 feet through solid ore 54 feet wide. The great kidney-shaped mass extended downward below the 1,500-foot level, and widened to 150 feet and even to 300 feet. The ore grew

GOULD AND CURRY MINERS READY FOR WORK.

richer and richer as the men advanced. Nothing like it had ever been known in the history of mining.

Here, in the heart of the Comstock, hundreds of naked miners were soon hewing down the ore. On all sides of a pyramidal mass of timber which grew larger every minute were twinkling stars of lamps. Everything in the bonanza was sent to the mill as fast as it was quarried out, and some of it was so rich that waste rock was added to aid amalgamation. An average block of ore three feet square contained from two hundred to five hundred dollars in silver and gold. The richest spot was near the California line, where clusters of malleable silver in coiled wires occurred beside shining stephanite, pale-green and steel-gray chlorides, and lustrous black silver glance, besides masses of the most exquisite crystals of every color known to the mineralogist.

In six years Consolidated Virginia milled 682,355 tons of ore, producing $60,732,882; California, in four years, milled 486,043 tons, producing $43,727,837. The total yield of the Big Bonanza had been nearly $105,000,000, and more than $73,000,000 had been

paid in dividends. Extreme haste was necessary in extracting the ore, so great was the danger of a disaster. Mackay and Fair hardly rested day or night till the bonanza was exhausted. Outside, all the exchanges of the world were fighting over Comstocks. The two mines, rated in 1871 at $40,000, were rated in 1875 at $160,000,000. Thirty mines on the lode were now valued at about $400,000,000. So much money was withdrawn from legitimate business and flung into the stock market that when the inevitable crash came and the Bank of California failed, every industry of the Pacific coast was checked for years.

In the midst of the bonanza excitement Virginia City was swept by a great fire, the culmination of a long series of mining disasters, and in a few hours a territory half a mile square was a mass of ruins. The mining companies lost acres of supplies and lumber; Ophir, Consolidated Virginia, and California had all their buildings burned; two thousand stores, hotels, lodging houses, and dwellings were destroyed. The very next day men were at work in the ruins, on the rugged hillsides, in the ravines, by the monstrous waste dumps, clearing away, rebuilding on a still more massive scale the giant machine shops, hoisting works, and mills. The two bonanza mines lost $1,500,000, and yet they managed to keep up regular dividends at the rate of $1,080,000 a month!

Adolph Sutro.

All these years one indomitable mill owner and engineer, Adolph Sutro, had been fighting single-handed the men who controlled the Comstock. Away back in 1860 he had advised a deep adit, and in 1865 he obtained a franchise for the Sutro Tunnel Company, with Senator Stewart as president. The mining companies bound themselves to pay perpetual royalties after the completion of the tunnel. Congress, assuming the regulation of the immense mining interests involved, passed an act which, still further protecting the enterprise, made the very titles of the mining companies dependent upon the fulfillment of their obligations. Large subscriptions were made, and

it was expected that the bonds would sell readily. But early in 1867 the Bank of California syndicate began to perceive that the Sutro Tunnel, delivering ore at the Carson River mills and mining supplies nearly two thousand feet below the surface, might very easily destroy their control of the Comstock and its dependent industries. Therefore they declared war, and opened hostilities. Stewart resigned; subscriptions were all withdrawn; shrewd lawyers and politicians were employed to obtain the repeal of the franchise and of the act of Congress; financiers in New York and Europe were warned not to touch Sutro bonds.

Years after Sutro said in conversation: "Ah, it was a hard thing to have so many old friends in San Francisco and Virginia City actually afraid to be seen talking to me after the fiat had gone forth that I must be crushed at any cost. But I kept on fighting. There was one time, I remember, when I had to go to Washington to save my interests from destruction. I had no money. All the profits of my mill had been swallowed up. But I had a lot in a little California town, and I sold it for two hundred dollars, and with that I managed to get to Washington. I stayed there somehow that winter, poor as I was, and fought my enemies, and came out ahead. But their newspapers said I had bribed Congress—out of my two hundred dollars!"

After making the most strenuous efforts Sutro failed to place his bonds. In 1869, turning for help to the working miners, he delivered a remarkable address in Virginia City. Large cartoons illustrated his bitter eloquence. One showed Bill Sharon's Big Woodpile, another Bill Sharon's Crooked Railroad, a third the then recent fire in Yellow Jacket, where forty-two lives had been lost that might have been saved had the Sutro Tunnel existed. He appealed to the miners' unions for stock subscriptions with which to begin work. "Will the people of Nevada see me crushed out now? . . . Come in together. Let two thousand laboring men pay in ten dollars apiece a month, and insure the construction of the tunnel, carrying with it the control of the mines. . . . From dependents you will be masters." With such sentences he addressed the working miners of the Comstock, who actually raised fifty thousand dollars in a few weeks, and on October 19th resolute Sutro broke ground in his great undertaking. Nevertheless the tunnel was steadily opposed by the California and Nevada Senators and by nearly all the mining men on the Comstock. The history of the long struggle is embalmed in the pages of the Congressional Record and innumerable public documents. Sutro bonds were finally sold, but the difficulties of the undertaking proved greater than had been expected, and the period of the bonanzas passed before the lode was reached.

The progress of the work was dramatic. The face of the rock "showed a temperature of 114°." Two or three hours was all that the strongest men could work. Endurance was strained to its utmost capacity. Man after man dropped down on the rocky floor and was carried to the surface babbling and incoherent. This strenuous toil continued till July 8, 1878, when Sutro himself, half naked like one of his miners, labored at the front, and finally crawled through a jagged hole into the Savage drift, "overcome with excitement," as one of the newspaper accounts

SUTRO TUNNEL, SUTRO, NEVADA.

said. What had been contemptuously called "Sutro's coyote hole" thus became an accomplished fact.

Through such passionate conflicts as those described the heroes of the Comstock continued making workshops, mills, machinery; building two marvelously picturesque towns along the lode, and hiding underneath the greater creation—the real City of the Comstock. Here, in deeps below deeps, are three-mile streets, mysterious labyrinths, water torrents, burning heats, perils numberless, legends that might serve to fill a volume. Time was when twelve thousand miners toiled in these vast galleries, swinging picks, hammering drills, raising timbers to place, climbing to the stopes, breaking down the ore, pushing lines of loaded cars to stations on the hoisting shafts. They were superb athletes, with muscles evenly developed by their labor. A few of them remain, scraping out the ore left in older workings and maintaining to the fullest degree the fine old-time pride of their craft. For sixteen years, however, the mines have been

in borrasca, and they may never again pay a profit to their owners. Still, with faith and endurance that are sublime, the heroes of the Comstock cling to its fallen fortunes, and continue the search for new bonanzas.

[EDITORIAL NOTE.—The full story of the mines, as illustrated by the great Comstock lode, prepared by Mr. Shinn, will constitute the next volume of the Story of the West Series, edited by Mr. Ripley Hitchcock, to be published by D. Appleton & Co. in October. Our readers need hardly be told that Mr Shinn has special qualifications in his familiar acquaintance with the subject and his rare literary skill, which will impart special interest and value to this work.]

A MEASURE OF MENTAL CAPACITY.

BY DR. EMIL KRAEPELIN,
PROFESSOR OF PSYCHIATRY AT HEIDELBERG.

(*From an Address delivered in behalf of the Heidelberger Frauenverein.*)

WE are able to calculate almost precisely the amount of work any given machine—as a steam engine or an electric-lighting plant—is capable of performing, and the amount of fuel that will be required to develop the calculated power. When we come to man we are much less certain, although a skillful army surgeon can tell almost at a glance whether the recruit standing before him is strong enough to meet the requirements of the service, and there are machines in the market that will inform us in what time we can pull a given weight to a given height. But we have no measure that we can apply to the capacity for mental work, and no units of mental valuation. The most we can do is to compare the intellectual capacity of one man with that of another by the mental results they have severally achieved in practice. When we wish to test the fitness of a candidate for a position of trust or responsibility, we subject him to an examination, which relates, however, mostly to what he has learned, and from which we guess in a rather indirect way what he may be capable of doing in the future, and with relation to other matters than those on which we examine him; and the test is very often deceptive: for those who have made the most brilliant displays in the examination frequently fail in capacity to make practical application of what they have learned only theoretically; or they fail by irregularity, frequent and marked changes in their disposition to work, want of endurance, or too great dependence on external conditions, of which the examination gives no prediction. Such efforts as have been made to obviate this difficulty have hitherto failed to meet their object.

It has, however, recently become possible to reach fairly approximate conclusions concerning mental capacity, such as other-

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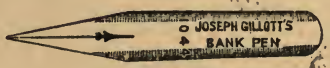

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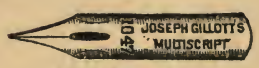

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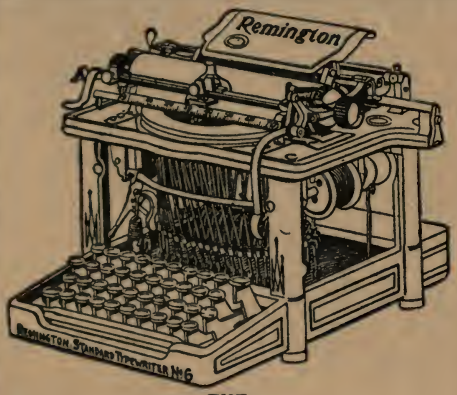

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